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特許公報

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発明の数 1

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1

⑤4継目弾性密封材

⑳特　　願　昭43—14622
㉒出　　願　昭43(1968)3月8日
㉗発 明 者　安藤昭夫
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㉔代 理 人　弁理士　浅村成久　外3名

図面の簡単な説明

第1図は本発明の密封材の渦巻き状製品の斜視図、第2図は本発明品の復元性能を示す線図、第3図は本発明の密封材の平板積層品の斜視図である。

発明の詳細な説明

建築、土木その他の構造物の継ぎ目の防水、防塵、緩衝等の密封目的に、ポリウレタン、ポリ塩化ビニール等の合成樹脂の弾性スポンジ体に、アスファルトゴム等の天然樹脂質、ポリプロピレン、ポリブタジエン、ポリ酢酸ビニール等の合成樹脂質を配合した粘性樹脂質物を含浸した密封材が、広く有効に使用されている。

上記のような密封材は、継目間隙以下の厚さに圧縮し、その時間的復元履歴を利用して継目間隙に挿入し、防水防塵、緩衝等の目的に応じた適当な圧縮状態で、継目部両壁に弾圧接着せしめられるものであつて、その圧縮状態からの復元履歴はスポンジ体及び含浸剤の性状、圧縮条件並びに温度により左右される。

合成樹脂の弾性スポンジ体は、通常内部気孔が完全に圧扁されて空隙のなくなる状態までの圧縮即ち平行圧縮限界までは、圧力を去れば瞬時に元の厚さまで膨張復元するが、その内部気孔に、アスファルト、粘性合成樹脂等の含浸剤が存在した

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場合は、圧縮による排気に従い含浸剤の粘着性並びに含浸剤自体の可塑化応力により、スポンジ自体の弾発復元力とのバランスの下に、その復元は時間的履歴を示すものであり、又全固体容積以上の圧縮は、内部含浸剤の流失、スポンジ体の変形、破壊等による密封性能低下を来すので、過度の圧縮は勿論採用できない。

従来、この種のスポンジ状継目密封材を使用する場合は施工現場において人手によつて圧搾することが多く、特に厚い場合にはプレス機を用いることもあるが、何れにしても非常に手間を要し、又均一圧搾が困難であり、まして平行圧縮限界までの圧縮には相当の加圧が必要で現場作業には適さないばかりでなく、作業時間の経過とともに不均一復元状態になり易く特に気温の高い場合には急速に膨張復元するので、作業が難しくなつたり作業時間が制約される等の欠陥があつた。

本発明者等は上記の粘性含浸剤を含有した弾性スポンジ体の圧縮復元性能につき種々検討した結果、一たん所定圧縮状態に圧搾し、そのままの状態で適当時間維持した後に圧縮状態を解放した場合の時間的復元履歴が、圧搾して直ちに解放した場合に比べて著しく延時性となること、並びにその圧縮が平行圧縮限界に近接するに従い延時性が急激に増大し平行圧縮限界においてその延時性が最大となることを見出し、この条件に適合した圧縮梱包状態の密封材とすることにより、従来の現場における圧搾施工上の欠陥を解決することに成功したものである。

即ち、本発明は、アスファルト、ゴム等の天然樹脂或いはポリプロピレン、ポリブタジエン、ポリ酢酸ビニール等の合成樹脂合成ゴム等を配合した粘性樹脂質組成物の含浸剤を、ポリウレタン、ポリ塩化ビニール等の合成樹脂のテープ状、棒状、帯状の弾性スポンジ体の内部に含浸せしめたものを、ロール或いは平板プレス機により、内部気隙がなくなる平行圧縮限界に達するまでの所要圧縮

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を施すよう一面方向に圧搾し、直ちに巻芯上に離型紙、又は離型フイルムと重ねて渦巻き状に積層捲き取り、その外周を包装紙或いは熱収縮性フイルムで包み、緊締状態として梱包するか、或いは平板状に圧搾されたものを直ちに離型シートと交互に重ね合せ積層し、その上下面に押え板を置き、緊締バンドによつて緊縛し、圧縮状態を維持するよう梱包したものである。

以下、本発明の具体例について説明する。

合成樹脂の弾性スポンジとしてエステル型ポリウレタン、嵩比重0.03g／ccを用い、幅20㎜厚さ40㎜、長さ2mの棒状物とし、これに針入度80～100のアスファルトの75％ピチューメンを含浸し、75％含浸で嵩比重0.15g／ccとする。このものの全固体容積までの圧縮即ち平行圧縮限界は計算上14.6％略元の厚さの1／7圧縮に相当するが、実際上完全な空気排出は不可能であり、1／6～1／6.5厚さまでの圧搾が限界である。

これに対し、第1図に示すように、前記圧搾後の帯状物1を直ちに直径約5㎝の巻芯上に離型性フイルム3を重ね合せて渦巻き状に捲回積層し、その外周に熱収縮性の塩化ビニールの0.06㎜厚のフイルムチューブ4を嵌めて、加熱収縮して緊縮梱包した外径約13㎝の本発明品は、下表のように著しく延時復元性を示した。

圧縮維持時間		元厚の1／4復元までの時間	1／2までの
対称A	1分	10分	30分
本発明品	Ⅰ60分	30分	90分
	Ⅱ24時間	120分	210分
	Ⅲ30日	140分	230分

上表における圧縮維持時間は、圧縮梱包後、梱包を解いて解放するまでの経過時間である。

なお、この圧縮梱包の場合の圧縮を1／2とした場合の圧縮維持時間による延時性の発現は下表のようにその程度は、平行圧縮限界附近まで圧縮したものに比べ少ない。

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圧縮維持時間		100％復元までの時間
対称a	1分	35分
本発明品b	1日	50分
〃	c30日	60分

第2図はこの状態を示すグラフである。

第3図は平板状梱包の場合の1個の斜視図であつて、平板プレス機で圧搾した帯状物5を、圧搾後直ちに離型機6と交互に重ね合せ積層し、上下の押え板7に挟んで、バンド8により緊縛包装したものである。この平板梱包の場合においても前例と同様の復元性を示すが生ずる彎曲ぐせや伸長などの問題がなく極めて好ましい密封体となる。

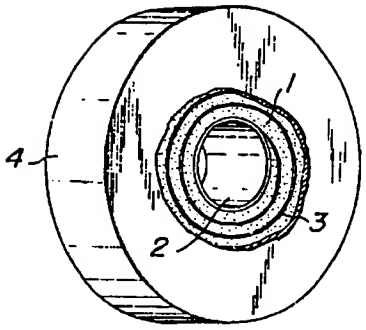
なお以上の復元延時性は、気温の高低によつて含浸剤の粘度、可塑化応力が変化し、増減するが、圧縮維持時間によりその程度が変動することは勿論であり、又特に気温の低い時には、加熱により復元性を生じさせねばならない場合もある。

以上説明したように、本発明によれば使用目的に応じた所要圧縮状態とした密封材を梱包状態として、使用時点までその圧縮状態が全長にわたつて均一に保持され、梱包を解いて使用する場合、復元時間が延長されて現場施工の作業時間を適宜調整しつつ、むらのない施工が実施できるようになる。又本発明品は単位梱包量が増大され、保存、取扱い、輸送等の面で極めて有利である。

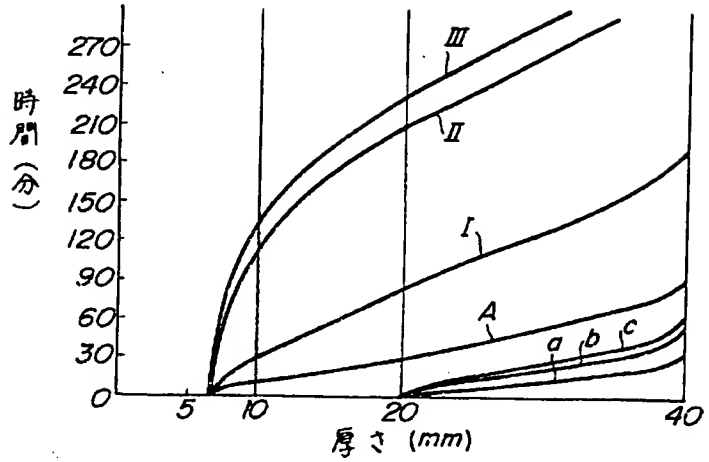
㊀特許請求の範囲

1　粘性樹脂質組成物を含浸した弾性合成樹脂スポンジのテープ状、棒状又は帯状物を、一面方向に圧搾した状態で、離型シートを介在せしめて、渦巻き状に捲回積層あるいは平板状に重ね合せ積層して、その圧縮状態を維持するよう緊縮梱包してなる継目密封材。

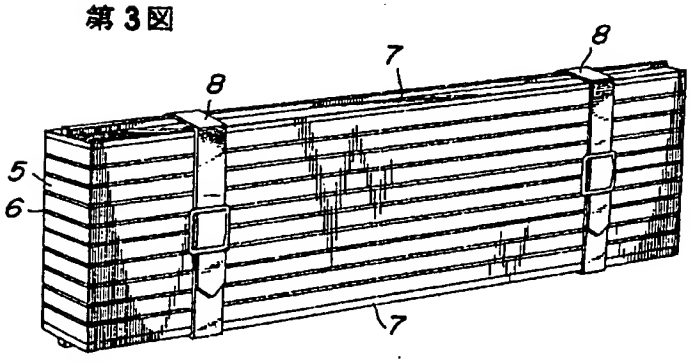
第1図


1
2
3
4

第2図


時間（分）
270
240
210
180
150
120
90
60
30
0
5
10
20
40
厚さ (mm)
III
II
I
A
a
b
c

第3図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8

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ELASTIC JOINT SEALING MATERIAL
[Tsugime dan'sei mippuuzai]

Akio Ando, et al.

UNITED STATES PATENT AND TRADEMARK OFFICE
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TITLE	(54):	ELASTIC JOINT SEALING MATERIAL
FOREIGN TITLE	(54A):	TSUGIME DAN'SEI MIPPUUZAI

SPECIFICATION

Brief Explanation of Drawings

Figure 1 is a perspective drawing of a convoluted product that is a sealing material of the present invention, Figure 2 is a graph showing the restoration performances of the articles of the present invention, and Figure 3 is a perspective drawing of a flat laminate article that is a sealing material of the present invention.

Detailed Explanation of the Invention

Sealing materials obtained by allowing a viscous resin substance containing a natural resin substance, such as asphalt rubber, or a synthetic resin substance, such as polypropylene, polybutadiene, polyvinyl acetate, etc., to be impregnated in an elastic sponge material of a synthetic resin, such as polyurethane, polyvinyl chloride, etc., are widely utilized for the purpose of sealing joints utilized in architectural, civil-engineering, and other types of construction in order to make them water and dust resistant, to provide buffering, etc.

A sealing material such as those above is compressed to a thickness less than the joint interval, inserted between the joints by using its temporal restoration history, and pressured and adhered to both walls of the joint portion while being compressed to a degree that suits the usage purpose, which is water/dust resistance, buffering, etc. Its restoration history from the compressed state is

influenced by the properties of the sponge material and the impregnant, the compression conditions, and the temperature.

When compressed, an elastic sponge material of a synthetic resin normally expands and restores its original thickness instantaneously once the pressure is removed, as long as the compression is up to the point of the parallel compression limit, at which the internal pores are completely pressed and at which the cavities are eliminated. However, if an impregnant, such as asphalt or a viscous synthetic resin, is present inside the internal pores, the restoration exhibits a temporal history based on the balance between the spring restoration ability of the sponge itself and the viscosity and plasticizing stress of the impregnant generated during the evacuation that is caused by the compression. In addition, if the compression exceeds the total solid volume, the sealing performance becomes lower due to the outflow of the internal impregnant, deformation or destruction of the sponge material, etc., and therefore, needless to say, excessive compression cannot be utilized.

Conventionally, in the usage of this type of sponge-like joint sealing material, manual pressuring is often performed at an operation site, and if it is particularly thick, a press machine is occasionally utilized. In any case, this is a very troublesome task. Moreover, it is difficult to pressure evenly, and, in particular, compressing to the parallel compression limit takes a considerable amount of pressure

and is not suitable for on-site operations. Moreover, the restored state becomes likely to be uneven as the operation time passes, and if the temperature is particularly high, the expansion and restoration occur rapidly, which makes the operation difficult or limits the operation time.

The present inventors conducted various studies on the compression and restoration performances of elastic sponge materials containing the above-mentioned viscous impregnants. As a result, they discovered that the temporal restoration history of a case in which a prescribed compressed state is first obtained by pressuring, in which the compressed state is maintained as is for a suitable amount of time, and in which the compressed state is then released is substantially longer when compared to a case in which it is released immediately after being pressured. They also discovered that the time extension properties increase radically as the compression approaches the parallel compression limit and that the time extension properties reach the maximum at the parallel compression limit. Thus, they succeeded in solving the conventional shortcomings that occur at the time of an on-site pressuring operation by obtaining a sealing material that is in a compressed and packaged state that conforms to the above conditions.

The present invention is obtained as follows. An impregnant that is a viscous resin composition containing a natural resin, such as

asphalt or rubber, or a synthetic resin, such as polypropylene, polybutadiene, polyvinyl acetate, etc., is impregnated inside a tape-like, rod-like, or band-like elastic sponge material made of a synthetic resin, such as polyurethane or polyvinyl chloride. This is then pressured in one surface direction to a prescribed degree of compression, which is the parallel compression limit at which the internal air gaps are eliminated, by means of a roll or a flattening press machine. It is then immediately laminated and wound around a core in a convoluted manner while being overlapped with mold releasing paper or mold releasing film. Then, its outer periphery is wrapped with packaging paper or thermal contraction film, and the article is packaged in a restrained state. Or, the article, after being pressured to a flat shape, is immediately laminated with a mold releasing sheet in an alternately overlapping manner, is constricted by means of constricting bands by placing holding plates on the top and bottom surfaces, and is packaged in a manner such that the compressed state is maintained.

In the following, a concrete example of the present invention will be explained.

Ester-type polyurethane having a 0.03g/cc bulk ratio is utilized as the elastic sponge made of a synthetic resin. This is made into a rod-like material that is 20mm wide, 40mm thick, and 2m long. This is allowed to have 75% bitumen of asphalt having an 80~100 degree of

penetration impregnated in it, and the bulk ratio is made to be 0.15g/cc at 75% impregnation. The compression of this material to the point of the total solid volume, that is to say, to the point of the parallel compression limit is equivalent to 14.6%, which is roughly 1/7, of the original thickness according to calculations. However, complete air evacuation is impossible in reality, and therefore, the limit of the pressuring is 1/6~1/6.5 thickness.

As shown in Figure 1, a band-like material [1], after being pressured as mentioned earlier, is immediately wound and laminated around a core that is about 5cm in diameter in a convoluted manner together with a mold releasing film [3]. Onto its outer periphery, a 0.06mm-thick film tube [4] made of vinyl chloride having thermal contraction properties is fitted. Then, thermal contraction and constrictive packaging are performed. The thus-obtained article of the present invention having an outside diameter of about 13cm exhibited significant time-extended restoration properties as indicated in the table below.

Object	Compression Hold Time	Time it takes to restore 1/4 of the original thickness	Time it takes to restore 1/2 of the original thickness
A (Comparison)	1 minute	10 minutes	30 minutes
I(Article of Present Invention)	60 minutes	30 minutes	90 minutes
II(Article of Present Invention)	24 hours	120 minutes	210 minutes
III(Article of Present Invention)	30 days	140 minutes	230 minutes

The compression hold time in the above table is the time that passes after the compression packaging until the packaging is loosened and released.

In addition, in a case in which the compression at the time of this compression packaging is made to be 1/2, the time extension properties exhibited based on the compression hold time are lower than those of cases in which compression is carried out near to the parallel compression limit.

	Compression Hold Time	Time it takes for 100% restoration
a (Comparison)	1 minute	35 minutes
b (Article of Present Invention)	1 day	50 minutes
c (Article of Present Invention)	30 days	60 minutes

Figure 2 is a graph indicating these conditions.

Figure 3 is a perspective drawing of one side of a flat-shaped package that was obtained by pressuring band-like materials [5] using a flattening press machine, by immediately laminating them while alternately overlapping them with mold releasing paper [6] after the pressuring, by sandwiching them with top and bottom holding plates [7], and by packaging them in a restraining manner by using bands [8]. The same restoration properties as those of the previous example are also exhibited in this flat packaging, but a very desirable sealing material is obtained since it does not have problems such as warping or stretching.

The above restoration time extension properties increase or decrease depending on the temperature, which alters the plasticizing stress and viscosity of the impregnant. Needless to say, such degrees fluctuate depending on the compression hold time. In cases in which the temperature is particularly low, the restoration properties sometimes need to be exhibited by means of heating.

As explained earlier, according to the present invention, a sealing material that is in a prescribed compressed state that conforms to the usage purpose is packaged and its compressed state is evenly maintained over the entire length until it is utilized. Moreover, when it is released in order to be utilized, the extended restoration time makes it possible to suitably adjust the on-site operation time and to carry out an even operation. Moreover, the unit packaging quantity of the articles of the present invention is increased, and they are extremely advantageous in terms of preservation, handling, and transporting.

Claim

1. A joint sealing material obtained by allowing a tape-like, rod-like, or band-like material of an elastic synthetic resin sponge having a viscous resin composition impregnated in it to be pressured in one surface direction, by winding and laminating it in a convoluted manner or by overlapping and laminating it in a flat manner while allowing mold releasing sheets to be present in-between, and by

packaging it in a constricting manner such that the compressed state is maintained.

Figure 1

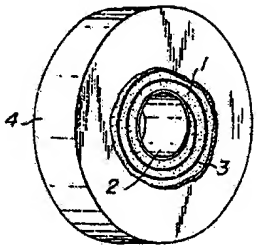

Figure 2

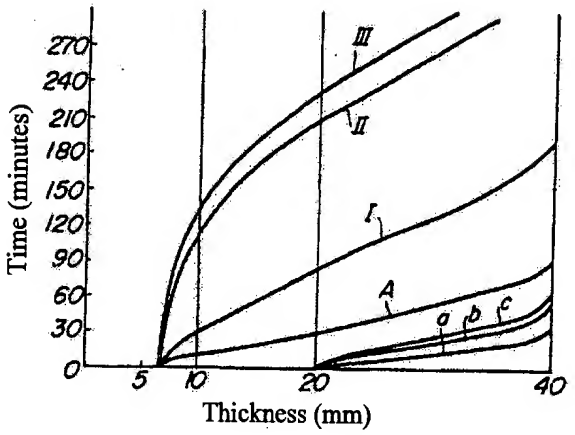

Figure 3